ABSTRACTS

SESSION 4: SELECTIVE BREEDING AND QUANTITATIVE GENETICS

ESTIMATION OF THE GENETIC PARAMETERS OF FEED EFFICIENCY IN JUVENILE NILE TILAPIA *Oreochromis niloticus* USING VIDEO ANALYSES

Hugues de Verdal[ab§], Marc Vandeputte[cd], Wagdy Mekkawy[be], Béatrice Chatain[d], John A.H. Benzie[bf]

[a]CIRAD, UMR116 ISEM, 34398, Montpellier, France
[b]Worldfish, Bayan Lepas, 11960, Penang, Malaysia
[c]GABI, INRA, AgroParisTech, Université Paris-Saclay, 78350, Jouy-en-Josas, France
[d]Ifremer, UMR9190 MARBEC, 34250, Palavas-les-Flots, France
[e]Animal Production Department, Ain Shams University, 11241 Cairo, Egypt.
[f]School Of Biological Earth and Environmental Sciences, University College Cork, Cork Ireland.

In aquaculture, feeds represent 30 to 70% of the total production costs. Improving feed efficiency is therefore key to achieve economic sustainability of fish farming. Improved feed efficiency also has strong positive environmental impacts, by reducing pressure on feed fisheries as well as nutrient load to the environment. From a social perspective, improved feed efficiency should also reduce the competition for raw materials between human food and animal feed. Improving feed conversion ratio (FCR) is thus crucial to develop a more sustainable aquaculture. To date, the contribution of genetic improvement to this goal has been hampered by the lack of efficient phenotyping methods and accurate genetic parameters of FCR in fish. We used video assessment of feed intake on individual fish reared in groups to estimate the genetic parameters of growth traits, feed intake, FCR and residual feed intake on 1,000 fish from 40 pedigreed families of the GIFT strain of Nile tilapia, *Oreochromis niloticus*. Juvenile fish (22.4 g) were evaluated during 13 consecutive meals over 7 days. We demonstrate genetic control for feed intake and FCR in tilapia, with heritability estimates of 0.45±0.09 and 0.32±0.11, respectively. Due to low genetic correlations between thermal growth coefficient (TGC) and FCR (r_A=-0.29±0.28), selection for TGC would only marginally improve FCR (2.6% by generation) while direct selection for FCR would improve FCR 16 % per generation. Interestingly, weight loss at fasting has a high genetic correlation with FCR (0.80±0.25) and a moderate heritability (0.23±0.12). This trait could be an easy to measure and efficient criterion to improve FCR by selective breeding in juvenile tilapia, but more work is needed to reach a final conclusion given that the observed phenotypic correlation is null between these two traits. We showed that FCR of juveniles could be efficiently improved by direct or indirect selection in Nile tilapia, but that selection on growth alone would only be marginally efficient. Additional work is required to measure FCR and correlated traits on older/larger fish for which the consumption of feed is maximal in the production cycle.

Keywords: Feed conversion ratio, growth, tilapia, heritability, correlations

§ Corresponding author. Tel: +33 467614467 E-mail address: hugues.de_verdal@cirad.fr